

System And Method For Distance Measurement By Inphase And Quadrature Signals In A Radio System

Abstract

A system and a method for distance measurement utilizes a radio system. The distance is measured by determining the time it takes a pulse train to travel from a first radio transceiver to a second radio transceiver and then from the second radio transceiver back to the first radio transceiver. The actual measurement is a two step process. In the first step, the distance is measured in coarse resolution, and in the second step, the distance is measured in fine resolution. A first pulse train is transmitted using a transmit time base from the first radio transceiver. The first pulse train is received at a second radio transceiver. The second radio transceiver synchronizes its time base with the first pulse train before transmitting a second pulse train back to the first radio transceiver, which then synchronizes a receive time base with the second pulse train. The time delay between the transmit time base and the receive time base can then be determined. The time delay indicates the total time of flight of the first and second pulse trains. The time delay comprises coarse and fine distance attributes.

The coarse distance between the first and second radio transceivers is determined. The coarse distance represents the distance between the first and second radio transceivers in coarse resolution. An inphase (I) signal and a quadrature (Q) signal are produced from the time delay to determine the fine distance attribute. The fine distance indicates the distance between the first and second transceivers in fine resolution. The distance between the first and second radio transceivers is then determined from the coarse distance and the fine distance attributes.